

DATA SHEET

74ABT245

Octal transceiver with direction pin
(3-State)

Product data
Supersedes data of 1998 Jan 16

2003 Feb 06

Octal transceiver with direction pin (3-State)

74ABT245

FEATURES

- Octal bidirectional bus interface
- 3-State buffers
- Output capability: +64 mA/–32 mA
- Latch-up protection exceeds 500 mA per Jedec Std 17
- ESD protection exceeds 2000 V per MIL STD 833 Method 3015 and 200 V per Machine Model
- Power-up 3-State
- Live insertion/extraction permitted
- Inputs are disabled during 3-State mode

DESCRIPTION

The 74ABT245 high-performance BiCMOS device combines low static and dynamic power dissipation with high speed and high output drive.

The 74ABT245 device is an octal transceiver featuring non-inverting 3-State bus compatible outputs in both send and receive directions. The control function implementation minimizes external timing requirements. The device features an Output Enable (\overline{OE}) input for easy cascading and a Direction (DIR) input for direction control.

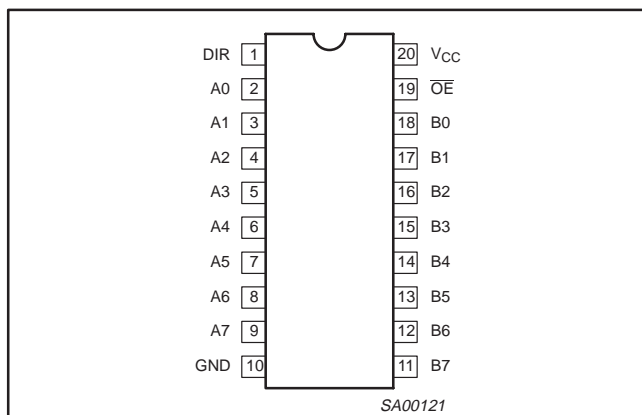
QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS $T_{amb} = 25\text{ }^{\circ}\text{C}; \text{GND} = 0\text{ V}$	TYPICAL	UNIT
t_{PLH} t_{PHL}	Propagation delay An to Bn or Bn to An	$C_L = 50\text{ pF}; V_{CC} = 5\text{ V}$	2.2 2.9	ns
C_{IN}	Input capacitance DIR, \overline{OE}	$V_I = 0\text{ V or }V_{CC}$	4	pF
$C_{I/O}$	I/O pin capacitance	Outputs disabled; $V_O = 0\text{ V or }V_{CC}$	7	pF
I_{CCZ}	Total supply current	Outputs disabled; $V_{CC} = 5.5\text{ V}$	50	μA

ORDERING INFORMATION

PACKAGES	TEMPERATURE RANGE	PART NUMBER	DWG NUMBER
20-Pin plastic SO	–40 °C to +85 °C	74ABT245D	SOT163-1
20-Pin Plastic SSOP Type II	–40 °C to +85 °C	74ABT245DB	SOT339-1
20-Pin Plastic TSSOP Type I	–40 °C to +85 °C	74ABT245PW	SOT360-1

PIN CONFIGURATION



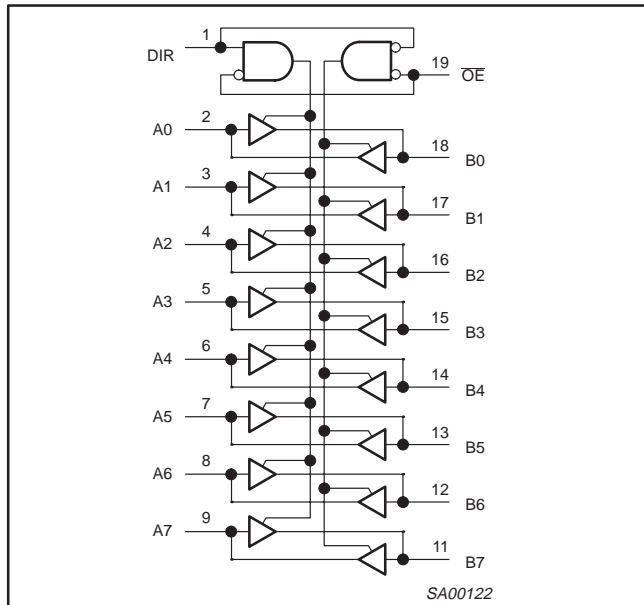
PIN DESCRIPTION

PIN NUMBER	SYMBOL	NAME AND FUNCTION
1	DIR	Direction control input
2, 3, 4, 5, 6, 7, 8, 9	A0 – A7	Data inputs/outputs (A side)
18, 17, 16, 15, 14, 13, 12, 11	B0 – B7	Data inputs/outputs (B side)
19	\overline{OE}	Output enable input (active-LOW)
10	GND	Ground (0 V)
20	V_{CC}	Positive supply voltage

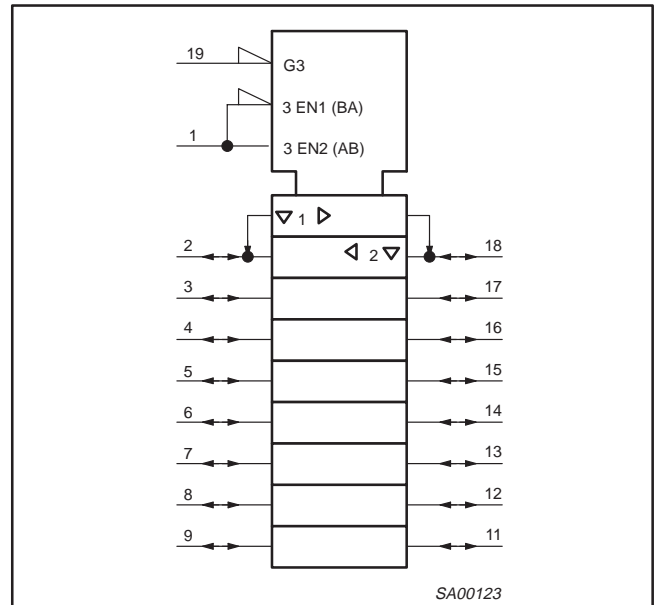
Octal transceiver with direction pin (3-State)

74ABT245

LOGIC SYMBOL



LOGIC SYMBOL (IEEE/IEC)



FUNCTION TABLE

INPUTS		INPUTS/OUTPUTS	
\overline{OE}	DIR	An	Bn
L	L	An = Bn	Inputs
L	H	Inputs	Bn = An
H	X	Z	Z

H = High voltage level
 L = Low voltage level
 X = Don't care
 Z = High impedance "off" state

ABSOLUTE MAXIMUM RATINGS^{1, 2}

SYMBOL	PARAMETER	CONDITIONS	RATING	UNIT
V_{CC}	DC supply voltage		-0.5 to +7.0	V
I_{IK}	DC input diode current	$V_I < 0$	-18	mA
V_I	DC input voltage ³		-1.2 to +7.0	V
I_{OK}	DC output diode current	$V_O < 0$	-50	mA
V_{OUT}	DC output voltage ³	output in Off or High state	-0.5 to +5.5	V
I_{OUT}	DC output current	output in Low state	128	mA
T_{stg}	Storage temperature range		-65 to 150	°C

NOTES:

- Stresses beyond those listed may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- The performance capability of a high-performance integrated circuit in conjunction with its thermal environment can create junction temperatures which are detrimental to reliability. The maximum junction temperature of this integrated circuit should not exceed 150 °C.
- The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

Octal transceiver with direction pin (3-State)

74ABT245

RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	LIMITS		UNIT
		Min	Max	
V _{CC}	DC supply voltage	4.5	5.5	V
V _I	Input voltage	0	V _{CC}	V
V _{IH}	HIGH-level input voltage	2.0		V
V _{IL}	LOW-level Input voltage		0.8	V
I _{OH}	HIGH-level output current		-32	mA
I _{OL}	LOW-level output current		64	mA
Δt/Δv	Input transition rise or fall rate	0	5	ns/V
T _{amb}	Operating free-air temperature range	-40	+85	°C

DC ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS					UNIT
			T _{amb} = +25 °C			T _{amb} = -40 °C to +85 °C		
			Min	Typ	Max	Min	Max	
V _{IK}	Input clamp voltage	V _{CC} = 4.5 V; I _{IK} = -18 mA		-0.9	-1.2		-1.2	V
V _{OH}	High-level output voltage	V _{CC} = 4.5 V; I _{OH} = -3 mA; V _I = V _{IL} or V _{IH}	2.5	2.9		2.5		V
		V _{CC} = 5.0 V; I _{OH} = -3 mA; V _I = V _{IL} or V _{IH}	3.0	3.4		3.0		V
		V _{CC} = 4.5 V; I _{OH} = -32 mA; V _I = V _{IL} or V _{IH}	2.0	2.4		2.0		V
V _{OL}	Low-level output voltage	V _{CC} = 4.5 V; I _{OL} = 64 mA; V _I = V _{IL} or V _{IH}		0.42	0.55		0.55	V
I _I	Input leakage current	Control pins V _{CC} = 5.5 V; V _I = GND or 5.5 V		±0.01	±1.0		±1.0	μA
		Data pins V _{CC} = 5.5 V; V _I = GND or 5.5 V		±5	±100		±100	μA
I _{OFF}	Power-off leakage current	V _{CC} = 0.0 V; V _I or V _O ≤ 4.5 V		±5.0	±100		±100	μA
I _{PU} /I _{PD}	Power-up/down 3-State output current ³	V _{CC} = 2.0 V; V _O = 0.5 V; V _I = GND or V _{CC} ; V _{OE} = Don't care		±5.0	±50		±50	μA
I _{IH} + I _{OZH}	3-State output High current	V _{CC} = 5.5 V; V _O = 2.7 V; V _I = V _{IL} or V _{IH}		5.0	50		50	μA
I _{IL} + I _{OZL}	3-State output Low current	V _{CC} = 5.5 V; V _O = 0.5 V; V _I = V _{IL} or V _{IH}		-5.0	-50		-50	μA
I _{CEX}	Output high leakage current	V _{CC} = 5.5 V; V _O = 5.5 V; V _I = GND or V _{CC}		5.0	50		50	μA
I _O	Output current ¹	V _{CC} = 5.5 V; V _O = 2.5 V	-40	-100	-180	-40	-180	mA
I _{CCH}	Quiescent supply current	V _{CC} = 5.5 V; Outputs HIGH; V _I = GND or V _{CC}		50	250		250	μA
I _{CCL}		V _{CC} = 5.5 V; Outputs LOW; V _I = GND or V _{CC}		24	30		30	mA
I _{CCZ}		V _{CC} = 5.5 V; Outputs 3-State; V _I = GND or V _{CC}		50	250		250	μA
ΔI _{CC}	Additional supply current per input pin ²	Outputs enabled, one input at 3.4 V, other inputs at V _{CC} or GND; V _{CC} = 5.5 V		0.5	1.5		1.5	mA
		Outputs 3-State, one data input at 3.4 V, other inputs at V _{CC} or GND; V _{CC} = 5.5 V		50	250		250	μA
		Outputs 3-State, one enable input at 3.4 V, other inputs at V _{CC} or GND; V _{CC} = 5.5 V		0.5	1.5		1.5	mA

NOTES:

- Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
- This is the increase in supply current for each input at 3.4 V.
- This parameter is valid for any V_{CC} between 0 V and 2.1 V with a transition time of up to 10 msec. For V_{CC} = 2.1 V to V_{CC} = 5 V ± 10%, a transition time of up to 100 μsec is permitted.

Octal transceiver with direction pin (3-State)

74ABT245

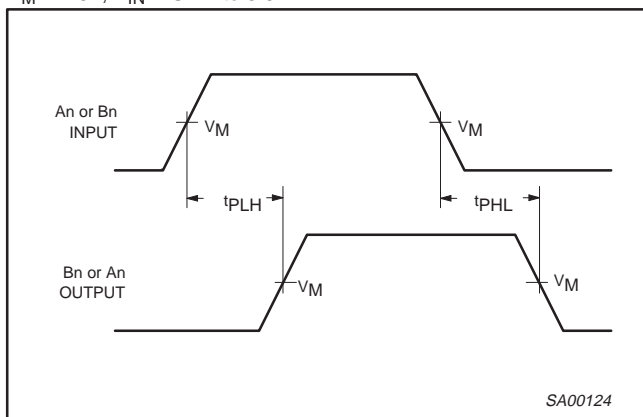
AC CHARACTERISTICS

GND = 0 V; $t_R = t_F = 2.5$ ns; $C_L = 50$ pF, $R_L = 500 \Omega$

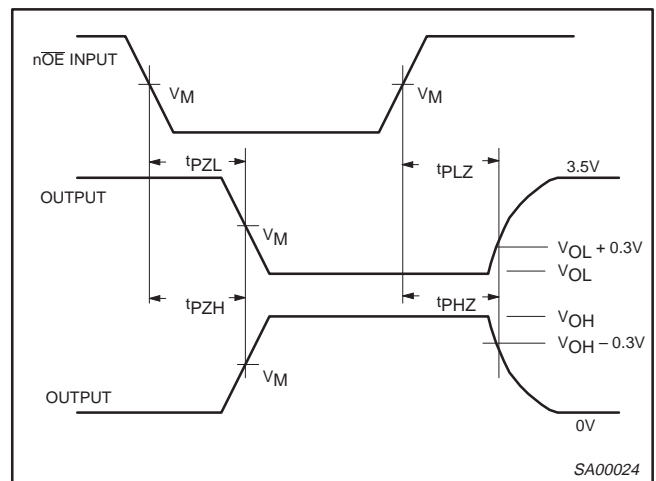
SYMBOL	PARAMETER	WAVEFORM	LIMITS					UNIT
			$T_{amb} = +25 \text{ }^\circ\text{C}$ $V_{CC} = +5.0 \text{ V}$			$T_{amb} = -40 \text{ }^\circ\text{C to } +85 \text{ }^\circ\text{C}$ $V_{CC} = +5.0 \text{ V } \pm 0.5 \text{ V}$		
			Min	Typ	Max	Min	Max	
t_{PLH} t_{PHL}	Propagation delay An to Bn or Bn to An	1	1.0	2.2	4.1	1.0	4.6	ns
t_{PZH} t_{PZL}	Output enable time to HIGH and LOW level	2	1.3	3.0	4.8	1.3	5.3	ns
t_{PHZ} t_{PLZ}	Output disable time from HIGH and LOW Level	2	1.0	4.7	6.2	1.0	7.2	ns

AC WAVEFORMS

$V_M = 1.5\text{V}$, $V_{IN} = \text{GND to } 3.0\text{V}$



Waveform 1. Waveforms showing the input to output propagation delays



Waveform 2. Waveforms showing the 3-State Output Enable and Disable times

TEST CIRCUIT AND WAVEFORMS

TEST	S1
t_{pd}	open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	open

DEFINITIONS
 $C_L =$ Load capacitance includes jig and probe capacitance; see AC CHARACTERISTICS for value.

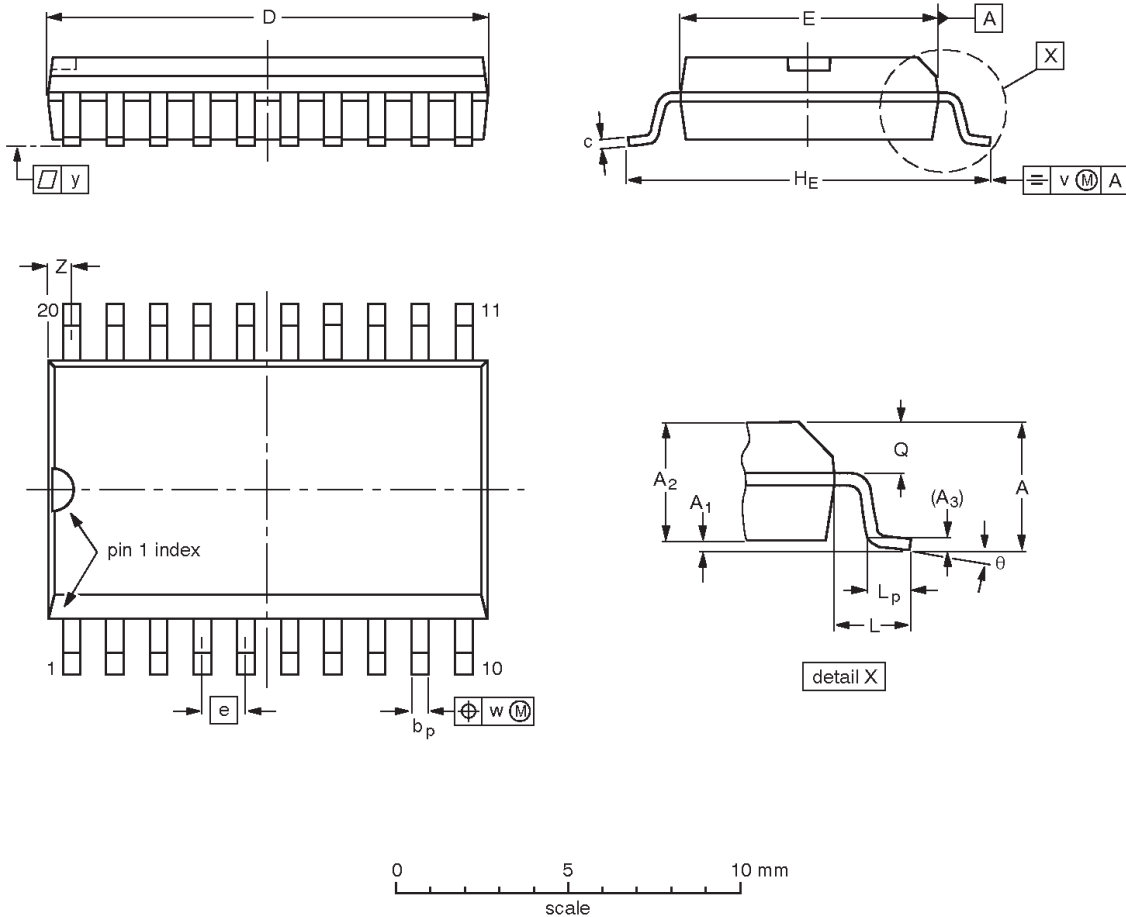
SA00012

Octal transceiver with direction pin (3-State)

74ABT245

SO20: plastic small outline package; 20 leads; body width 7.5 mm

SOT163-1



DIMENSIONS (inch dimensions are derived from the original mm dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	HE	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	2.65	0.30 0.10	2.45 2.25	0.25	0.49 0.36	0.32 0.23	13.0 12.6	7.6 7.4	1.27	10.65 10.00	1.4	1.1 0.4	1.1 1.0	0.25	0.25	0.1	0.9 0.4	8° 0°
inches	0.10	0.012 0.004	0.096 0.089	0.01	0.019 0.014	0.013 0.009	0.51 0.49	0.30 0.29	0.050	0.419 0.394	0.055	0.043 0.016	0.043 0.039	0.01	0.01	0.004	0.035 0.016	

Note

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

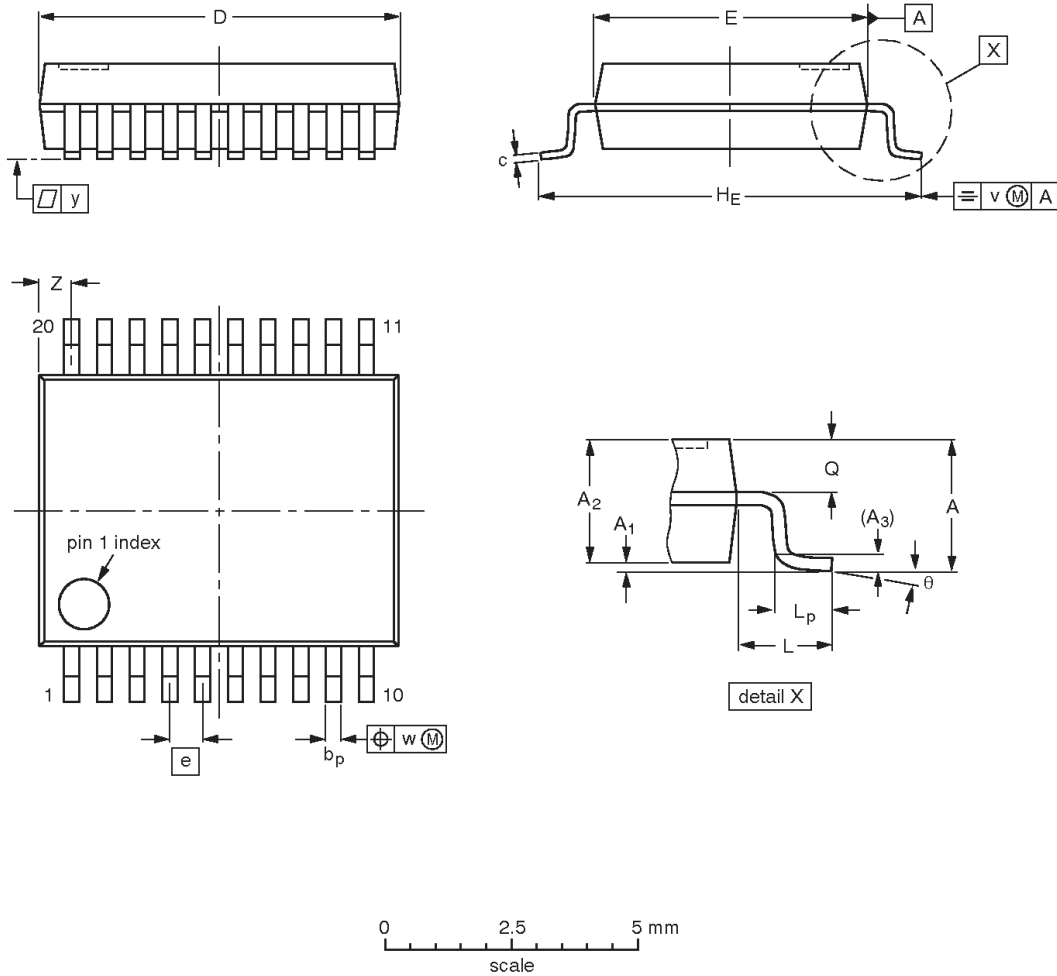
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT163-1	075E04	MS-013				97-05-22 99-12-27

Octal transceiver with direction pin (3-State)

74ABT245

SSOP20: plastic shrink small outline package; 20 leads; body width 5.3 mm

SOT339-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	HE	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	2.0	0.21 0.05	1.80 1.65	0.25	0.38 0.25	0.20 0.09	7.4 7.0	5.4 5.2	0.65	7.9 7.6	1.25	1.03 0.63	0.9 0.7	0.2	0.13	0.1	0.9 0.5	8° 0°

Note

1. Plastic or metal protrusions of 0.20 mm maximum per side are not included.

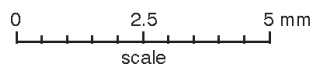
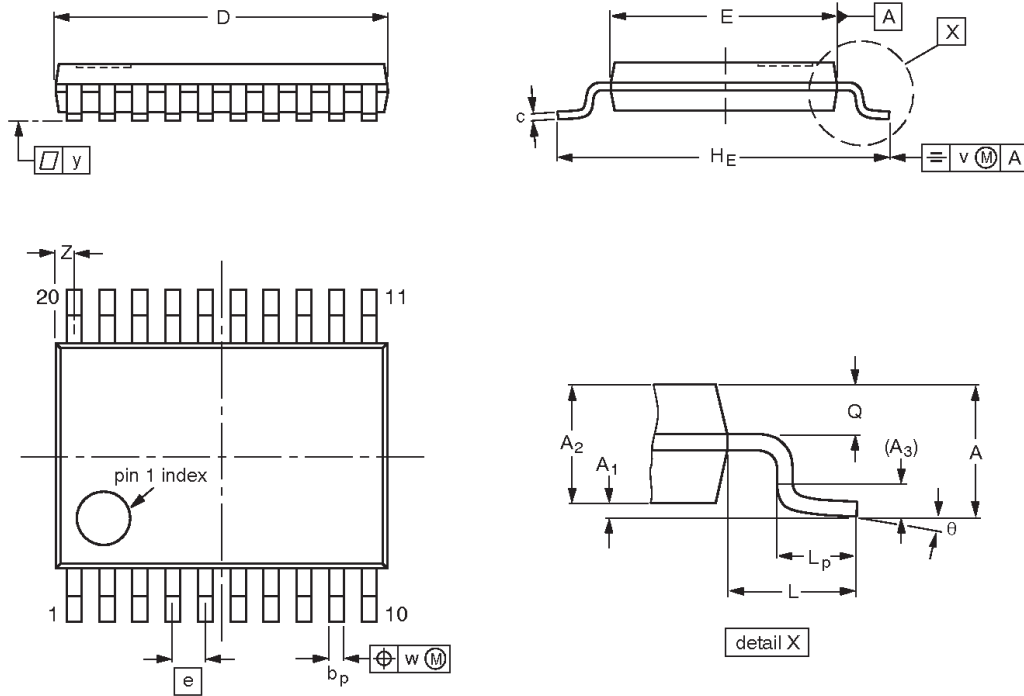
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT339-1		MO-150				95-02-04 99-12-27

Octal transceiver with direction pin (3-State)

74ABT245

TSSOP20: plastic thin shrink small outline package; 20 leads; body width 4.4 mm

SOT360-1



DIMENSIONS (mm are the original dimensions)

UNIT	A max.	A ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽²⁾	e	H _E	L	L _p	Q	v	w	y	Z ⁽¹⁾	θ
mm	1.10	0.15 0.05	0.95 0.80	0.25	0.30 0.19	0.2 0.1	6.6 6.4	4.5 4.3	0.65	6.6 6.2	1.0	0.75 0.50	0.4 0.3	0.2	0.13	0.1	0.5 0.2	8° 0°

Notes

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.
2. Plastic interlead protrusions of 0.25 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT360-1		MO-153				95-02-04 99-12-27

Octal transceiver with direction pin (3-State)

74ABT245

REVISION HISTORY

Rev	Date	Description
_3	20030206	Product data (9397 750 11087); ECN 853-1447 29305 of 17 December 2002; Supersedes Product specification (9397 750 03467) of 1998 Jan 16. Modifications: <ul style="list-style-type: none"> • Delete all references to N package. DIP20 package option discontinued.
_2	19980116	Product specification (9397 750 03467) 1998 Jan 16; ECN 853-1447 18867 of 16 January 1998. Supersedes data of 1996 Sep 10.

Data sheet status

Level	Data sheet status ^[1]	Product status ^{[2] [3]}	Definitions
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

[1] Please consult the most recently issued data sheet before initiating or completing a design.

[2] The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.

[3] For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

Definitions

Short-form specification — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

Limiting values definition — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

Application information — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

Disclaimers

Life support — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

Right to make changes — Philips Semiconductors reserves the right to make changes in the products—including circuits, standard cells, and/or software—described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no license or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.

Contact information

For additional information please visit
<http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

© Koninklijke Philips Electronics N.V. 2003
 All rights reserved. Printed in U.S.A.

Date of release: 01-03

For sales offices addresses send e-mail to:
sales.addresses@www.semiconductors.philips.com

Document order number:

9397 750 11087

Let's make things better.